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<110> BASF Plant Science GmbH

<120> TER gene of Euglena

<130> AE 20030715

<140> PF 54922

<141> 2003-10-10

<160> 11

<170> PatentIn version 3.1

<210> 1

<211> 1620

<212> DNA

<213> Euglena gracilis

<220>

<221> CDS

<222> (1)..(1620)

<223>

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Met Ser Cys Pro Ala Ser Pro Ser Ala Ala Val Val Ser Ala Gly Ala
1   5   10   15

ctc tgc ctg tgc gtg gca acg gta ttg ttg gcg act gga tcc aac ccc   96

2

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Leu Cys Leu Cys Val Ala Thr Val Leu Leu Ala Thr Gly Ser Asn Pro
              20                  25                  30

acc gcc ctg tcc act gct tcc act cgc tct ccg acc tca ctg gtc cgt          144
Thr Ala Leu Ser Thr Ala Ser Thr Arg Ser Pro Thr Ser Leu Val Arg
              35                  40                  45

ggg gtg gac agg ggc ttg atg agg cca acc act gca gcg gct ctg acg          192
Gly Val Asp Arg Gly Leu Met Arg Pro Thr Thr Ala Ala Ala Leu Thr
              50                  55                  60

aca atg aga gag gtg ccc cag atg gct gag gga ttt tca ggc gaa gcc          240
Thr Met Arg Glu Val Pro Gln Met Ala Glu Gly Phe Ser Gly Glu Ala
65                  70                  75                  80

acg tct gca tgg gcc gcc gcg ggg ccg cag tgg gcg gcg ccg ctc gtg          288
Thr Ser Ala Trp Ala Ala Ala Gly Pro Gln Trp Ala Ala Pro Leu Val
              85                  90                  95

gcc gcg gcc tcc tcc gca ctg gcg ctg tgg tgg tgg gcc gcc cgg cgc          336
Ala Ala Ala Ser Ser Ala Leu Ala Leu Trp Trp Trp Ala Ala Arg Arg
              100                 105                 110

agc gtg cgg cgg ccg ctg gca gcg ctg gcg gag ctg ccc acc gcg gtc          384
Ser Val Arg Arg Pro Leu Ala Ala Leu Ala Glu Leu Pro Thr Ala Val
              115                 120                 125

acc cac ctg gcc ccc ccg atg gcg atg ttc acc acc aca gcg aag gtc          432
Thr His Leu Ala Pro Pro Met Ala Met Phe Thr Thr Thr Ala Lys Val
              130                 135                 140

atc cag ccc aag att cgt ggc ttc atc tgc acg acc acc cac ccg atc          480
Ile Gln Pro Lys Ile Arg Gly Phe Ile Cys Thr Thr Thr His Pro Ile
145                 150                 155                 160

ggc tgt gag aag cgg gtc cag gag gag atc gcg tac gcc cgt gcc cac          528
Gly Cys Glu Lys Arg Val Gln Glu Glu Ile Ala Tyr Ala Arg Ala His
              165                 170                 175

ccg ccc acc agc cct ggc ccg aag agg gtg ctg gtc atc ggc tgc agt          576
Pro Pro Thr Ser Pro Gly Pro Lys Arg Val Leu Val Ile Gly Cys Ser
              180                 185                 190

acc ggc tac ggg ctc tcc acc cgc atc acc gct gcc ttc ggc tac cag          624
Thr Gly Tyr Gly Leu Ser Thr Arg Ile Thr Ala Ala Phe Gly Tyr Gln
              195                 200                 205

gcc gcc acg ctg ggc gtg ttc ctg gcg ggc ccc ccg acg aag ggc cgc          672
Ala Ala Thr Leu Gly Val Phe Leu Ala Gly Pro Pro Thr Lys Gly Arg
              210                 215                 220

ccc gcc gcg gcg ggc tgg tac aac acc gtg gcg ttc gag aag gcc gcc          720
Pro Ala Ala Ala Gly Trp Tyr Asn Thr Val Ala Phe Glu Lys Ala Ala
225                 230                 235                 240

ctg gag gcc ggg ctg tac gcc cgg agc ctt aat ggc gac gcc ttc gac          768
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3

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Leu Glu Ala Gly Leu Tyr Ala Arg Ser Leu Asn Gly Asp Ala Phe Asp
            245                 250                 255

tcc aca acg aag gcg cgg acg gtc gag gcg atc aag cgg gac ctc ggc      816
Ser Thr Thr Lys Ala Arg Thr Val Glu Ala Ile Lys Arg Asp Leu Gly
            260                 265                 270

acg gtg gac ctc gtg gtg tac agc atc gcc gcc ccg aag cgg acg gac      864
Thr Val Asp Leu Val Val Tyr Ser Ile Ala Ala Pro Lys Arg Thr Asp
            275                 280                 285

cct gcc acc ggc gtc ctc cac aag gcc tgc ctg aag ccc atc ggc gcc      912
Pro Ala Thr Gly Val Leu His Lys Ala Cys Leu Lys Pro Ile Gly Ala
            290                 295                 300

acg tac acc aac cgc act gtg aac acc gac aag gcg gag gtg acc gac      960
Thr Tyr Thr Asn Arg Thr Val Asn Thr Asp Lys Ala Glu Val Thr Asp
305                 310                 315                 320

gtc agc att gag ccg gcc tcc ccc gaa gag atc gcg gac acg gtg aag     1008
Val Ser Ile Glu Pro Ala Ser Pro Glu Glu Ile Ala Asp Thr Val Lys
                325                 330                 335

gtg atg ggc ggg gag gac tgg gag ctc tgg atc cag gcg ctg tcg gag     1056
Val Met Gly Gly Glu Asp Trp Glu Leu Trp Ile Gln Ala Leu Ser Glu
            340                 345                 350

gcc ggc gtg ctg gcg gag ggg gcc aag acg gtg gcg tac tcc tac atc     1104
Ala Gly Val Leu Ala Glu Gly Ala Lys Thr Val Ala Tyr Ser Tyr Ile
            355                 360                 365

ggc ccc gag atg acg tgg cct gtc tac tgg tcc ggc acc atc ggg gag     1152
Gly Pro Glu Met Thr Trp Pro Val Tyr Trp Ser Gly Thr Ile Gly Glu
            370                 375                 380

gcc aag aag gac gtg gag aag gct gcc aag cgc atc acg cag cag tac     1200
Ala Lys Lys Asp Val Glu Lys Ala Ala Lys Arg Ile Thr Gln Gln Tyr
385                 390                 395                 400

ggc tgc ccg gcg tac ccg gtg gtg gcc aag gcc ttg gtc acc cag gcc     1248
Gly Cys Pro Ala Tyr Pro Val Val Ala Lys Ala Leu Val Thr Gln Ala
                405                 410                 415

agc tcc gcc atc ccg gtg gtg ccg ctc tac atc tgc ctg ctg tac cgc     1296
Ser Ser Ala Ile Pro Val Val Pro Leu Tyr Ile Cys Leu Leu Tyr Arg
                420                 425                 430

gtt atg aag gag aag ggc acc cac gag ggc tgc atc gag cag atg gtg     1344
Val Met Lys Glu Lys Gly Thr His Glu Gly Cys Ile Glu Gln Met Val
            435                 440                 445

cgg ctg ctc acc acg aag ctg tac ccc gag aac ggg gcc ccc atc gtc     1392
Arg Leu Leu Thr Thr Lys Leu Tyr Pro Glu Asn Gly Ala Pro Ile Val
            450                 455                 460

gat gag gcc gga cgt gtg cgg gtg gat gac tgg gag atg gcg gag gat     1440
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4

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Asp Glu Ala Gly Arg Val Arg Val Asp Asp Trp Glu Met Ala Glu Asp
465                 470                 475                 480


gtg cag cag gct gtt aag gac ctc tgg agc cag gtg agc act gcc aac    1488
Val Gln Gln Ala Val Lys Asp Leu Trp Ser Gln Val Ser Thr Ala Asn
                485                 490                 495


ctc aag gac atc tcc gac ttc gct ggg tat caa act gag ttc ctg cgg    1536
Leu Lys Asp Ile Ser Asp Phe Ala Gly Tyr Gln Thr Glu Phe Leu Arg
                500                 505                 510


ctg ttc ggg ttc ggc att gac ggc gtg gac tac gac cag ccc gtg gac    1584
Leu Phe Gly Phe Gly Ile Asp Gly Val Asp Tyr Asp Gln Pro Val Asp
            515                 520                 525


gtg gag gcg gac ctc ccc agt gct gcc cag cag tag                    1620
Val Glu Ala Asp Leu Pro Ser Ala Ala Gln Gln
    530                 535
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<210> 2

<211> 539

<212> PRT

<213> Euglena gracilis

<400> 2

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Met Ser Cys Pro Ala Ser Pro Ser Ala Ala Val Val Ser Ala Gly Ala
1               5                   10                  15


Leu Cys Leu Cys Val Ala Thr Val Leu Leu Ala Thr Gly Ser Asn Pro
            20                  25                  30


Thr Ala Leu Ser Thr Ala Ser Thr Arg Ser Pro Thr Ser Leu Val Arg
            35                  40                  45


Gly Val Asp Arg Gly Leu Met Arg Pro Thr Thr Ala Ala Ala Leu Thr
    50                  55                  60


Thr Met Arg Glu Val Pro Gln Met Ala Glu Gly Phe Ser Gly Glu Ala
65                  70                  75                  80


Thr Ser Ala Trp Ala Ala Ala Gly Pro Gln Trp Ala Ala Pro Leu Val
                85                  90                  95
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5

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Ala Ala Ala Ser Ser Ala Leu Ala Leu Trp Trp Trp Ala Ala Arg Arg
            100             105             110

Ser Val Arg Arg Pro Leu Ala Ala Leu Ala Glu Leu Pro Thr Ala Val
            115             120             125

Thr His Leu Ala Pro Pro Met Ala Met Phe Thr Thr Thr Ala Lys Val
            130             135             140

Ile Gln Pro Lys Ile Arg Gly Phe Ile Cys Thr Thr Thr His Pro Ile
145             150             155             160

Gly Cys Glu Lys Arg Val Gln Glu Glu Ile Ala Tyr Ala Arg Ala His
                165             170             175

Pro Pro Thr Ser Pro Gly Pro Lys Arg Val Leu Val Ile Gly Cys Ser
            180             185             190

Thr Gly Tyr Gly Leu Ser Thr Arg Ile Thr Ala Ala Phe Gly Tyr Gln
            195             200             205

Ala Ala Thr Leu Gly Val Phe Leu Ala Gly Pro Pro Thr Lys Gly Arg
            210             215             220

Pro Ala Ala Ala Gly Trp Tyr Asn Thr Val Ala Phe Glu Lys Ala Ala
225             230             235             240

Leu Glu Ala Gly Leu Tyr Ala Arg Ser Leu Asn Gly Asp Ala Phe Asp
                245             250             255

Ser Thr Thr Lys Ala Arg Thr Val Glu Ala Ile Lys Arg Asp Leu Gly
            260             265             270

Thr Val Asp Leu Val Val Tyr Ser Ile Ala Ala Pro Lys Arg Thr Asp
            275             280             285

Pro Ala Thr Gly Val Leu His Lys Ala Cys Leu Lys Pro Ile Gly Ala
            290             295             300

Thr Tyr Thr Asn Arg Thr Val Asn Thr Asp Lys Ala Glu Val Thr Asp
305             310             315             320
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Val Ser Ile Glu Pro Ala Ser Pro Glu Glu Ile Ala Asp Thr Val Lys
            325         330            335


Val Met Gly Gly Glu Asp Trp Glu Leu Trp Ile Gln Ala Leu Ser Glu
            340             345            350


Ala Gly Val Leu Ala Glu Gly Ala Lys Thr Val Ala Tyr Ser Tyr Ile
            355            360            365


Gly Pro Glu Met Thr Trp Pro Val Tyr Trp Ser Gly Thr Ile Gly Glu
            370         375            380


Ala Lys Lys Asp Val Glu Lys Ala Ala Lys Arg Ile Thr Gln Gln Tyr
385                  390            395                  400


Gly Cys Pro Ala Tyr Pro Val Val Ala Lys Ala Leu Val Thr Gln Ala
                405            410                  415


Ser Ser Ala Ile Pro Val Val Pro Leu Tyr Ile Cys Leu Leu Tyr Arg
                420            425            430


Val Met Lys Glu Lys Gly Thr His Glu Gly Cys Ile Glu Gln Met Val
            435            440            445


Arg Leu Leu Thr Thr Lys Leu Tyr Pro Glu Asn Gly Ala Pro Ile Val
            450            455            460


Asp Glu Ala Gly Arg Val Arg Val Asp Asp Trp Glu Met Ala Glu Asp
465                  470            475                  480


Val Gln Gln Ala Val Lys Asp Leu Trp Ser Gln Val Ser Thr Ala Asn
                485            490                  495


Leu Lys Asp Ile Ser Asp Phe Ala Gly Tyr Gln Thr Glu Phe Leu Arg
            500            505                  510


Leu Phe Gly Phe Gly Ile Asp Gly Val Asp Tyr Asp Gln Pro Val Asp
            515            520            525


Val Glu Ala Asp Leu Pro Ser Ala Ala Gln Gln
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<211>   837

<212>   DNA

<213>   Euglena gracilis


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agccttaatg gcgacgcatt cgactctaca acgaaggcgc ggacggttga ggcgatcaag     120

cgggatctcg gcacggtgga cctcgtggtg tacagcatcg ccgccccgaa acggacggac     180

cctgccaccg gcgtcgtcca caaggcctgc ctgaagccca tcggcgccac ctacaccaac     240

cgcactgtga acaccgacaa ggcggaggtg accgatgtca gcatcgagcc ggcctccccc     300

gaggagatcg ccgacacggt gaaggtgatg ggcggggagg actgggagct ttggatccag     360

gcactgtcgg aggccggcgt gctggcggag ggggccaaga cggtggcata ctcctacatc     420

ggccccgaga tgacgtggcc cgtgtactgg tccggcacca ttggggaggc caagaaggac     480

gtggagaagg ccgctaagcg catcacacag cagtacggct gcccagcata cccggtggtg     540

gccaaggcct tggtcaccca ggccagctct gccatcccgg tggtgccgct ctacatctgc     600

ctgctgtacc gcgttatgaa ggagaagggc acccacgagg gctgcatcga gcagatggtg     660

cggctgctca ccacgaagct gtaccccggg aacggttccc ccattgtcga tgaggccggg     720

cgggtgcggg tggatgactg ggagatggcg gaggatgtgc agcaggctgt gaaggacctc     780

tggagccagg tgaacactgc caacctcaag gacatttccg attttgccgg ctatgaa      837


<210>   4

<211>   1329

<212>   DNA

<213>   Euglena gracilis


<220>

<221>   CDS

<222>   (1)..(1329)
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Met Gly Arg Arg Gly Ala Ala Val Gly Gly Ala Ala Arg Gly Arg Gly
1   5   10   15

ctc ctc cgc act ggc gct gtg gtg gtg aac atc gcc acc gcg gtc acc   96
Leu Leu Arg Thr Gly Ala Val Val Val Asn Ile Ala Thr Ala Val Thr
                20   25   30

cac ctg gcc ccc ccg atg gcg atg ttc acc acc aca gcg aag gtc atc   144
His Leu Ala Pro Pro Met Ala Met Phe Thr Thr Thr Ala Lys Val Ile
            35   40   45

cag ccc aag att cgt ggc ttc atc tgc acg acc acc cac ccg atc ggc   192
Gln Pro Lys Ile Arg Gly Phe Ile Cys Thr Thr Thr His Pro Ile Gly
        50   55   60

tgt gag aag cgg gtc cag gag gag atc gcg tac gcc cgt gcc cac ccg   240
Cys Glu Lys Arg Val Gln Glu Glu Ile Ala Tyr Ala Arg Ala His Pro
65   70   75   80

ccc acc agc cct ggc ccg aag agg gtg ctg gtc atc ggc tgc agt acc   288
Pro Thr Ser Pro Gly Pro Lys Arg Val Leu Val Ile Gly Cys Ser Thr
                85   90   95

ggc tac ggg ctc tcc acc cgc atc acc gct gcc ttc ggc tac cag gcc   336
Gly Tyr Gly Leu Ser Thr Arg Ile Thr Ala Ala Phe Gly Tyr Gln Ala
                100   105   110

gcc acg ctg ggc gtg ttc ctg gcg ggc ccc ccg acg aag ggc cgc ccc   384
Ala Thr Leu Gly Val Phe Leu Ala Gly Pro Pro Thr Lys Gly Arg Pro
            115   120   125

gcc gcg gcg ggc tgg tac aac acc gtg gcg ttc gag aag gcc gcc ctg   432
Ala Ala Ala Gly Trp Tyr Asn Thr Val Ala Phe Glu Lys Ala Ala Leu
        130   135   140

gag gcc ggg ctg tac gcc cgg agc ctt aat ggc gac gcc ttc gac tcc   480
Glu Ala Gly Leu Tyr Ala Arg Ser Leu Asn Gly Asp Ala Phe Asp Ser
145   150   155   160

aca acg aag gcg cgg acg gtc gag gcg atc aag cgg gac ctc ggc acg   528
Thr Thr Lys Ala Arg Thr Val Glu Ala Ile Lys Arg Asp Leu Gly Thr
                165   170   175

gtg gac ctc gtg gtg tac agc atc gcc gcc ccg aag cgg acg gac cct   576
Val Asp Leu Val Val Tyr Ser Ile Ala Ala Pro Lys Arg Thr Asp Pro
            180   185   190

gcc acc ggc gtc ctc cac aag gcc tgc ctg aag ccc atc ggc gcc acg   624
Ala Thr Gly Val Leu His Lys Ala Cys Leu Lys Pro Ile Gly Ala Thr
            195   200   205

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tac acc aac cgc act gtg aac acc gac aag gcg gag gtg acc gac gtc        672
Tyr Thr Asn Arg Thr Val Asn Thr Asp Lys Ala Glu Val Thr Asp Val
    210               215               220

agc att gag ccg gcc tcc ccc gaa gag atc gcg gac acg gtg aag gtg        720
Ser Ile Glu Pro Ala Ser Pro Glu Glu Ile Ala Asp Thr Val Lys Val
225               230               235               240

atg ggc ggg gag gac tgg gag ctc tgg atc cag gcg ctg tcg gag gcc        768
Met Gly Gly Glu Asp Trp Glu Leu Trp Ile Gln Ala Leu Ser Glu Ala
              245               250               255

ggc gtg ctg gcg gag ggg gcc aag acg gtg gcg tac tcc tac atc ggc        816
Gly Val Leu Ala Glu Gly Ala Lys Thr Val Ala Tyr Ser Tyr Ile Gly
          260               265               270

ccc gag atg acg tgg cct gtc tac tgg tcc ggc acc atc ggg gag gcc        864
Pro Glu Met Thr Trp Pro Val Tyr Trp Ser Gly Thr Ile Gly Glu Ala
          275               280               285

aag aag gac gtg gag aag gct gcc aag cgc atc acg cag cag tac ggc        912
Lys Lys Asp Val Glu Lys Ala Ala Lys Arg Ile Thr Gln Gln Tyr Gly
    290               295               300

tgc ccg gcg tac ccg gtg gtg gcc aag gcc ttg gtc acc cag gcc agc        960
Cys Pro Ala Tyr Pro Val Val Ala Lys Ala Leu Val Thr Gln Ala Ser
305               310               315               320

tcc gcc atc ccg gtg gtg ccg ctc tac atc tgc ctg ctg tac cgc gtt       1008
Ser Ala Ile Pro Val Val Pro Leu Tyr Ile Cys Leu Leu Tyr Arg Val
              325               330               335

atg aag gag aag ggc acc cac gag ggc tgc atc gag cag atg gtg cgg       1056
Met Lys Glu Lys Gly Thr His Glu Gly Cys Ile Glu Gln Met Val Arg
              340               345               350

ctg ctc acc acg aag ctg tac ccc gag aac ggg gcc ccc atc gtc gat       1104
Leu Leu Thr Thr Lys Leu Tyr Pro Glu Asn Gly Ala Pro Ile Val Asp
          355               360               365

gag gcc gga cgt gtg cgg gtg gat gac tgg gag atg gcg gag gat gtg       1152
Glu Ala Gly Arg Val Arg Val Asp Asp Trp Glu Met Ala Glu Asp Val
    370               375               380

cag cag gct gtt aag gac ctc tgg agc cag gtg agc act gcc aac ctc       1200
Gln Gln Ala Val Lys Asp Leu Trp Ser Gln Val Ser Thr Ala Asn Leu
385               390               395               400

aag gac atc tcc gac ttc gct ggg tat caa act gag ttc ctg cgg ctg       1248
Lys Asp Ile Ser Asp Phe Ala Gly Tyr Gln Thr Glu Phe Leu Arg Leu
              405               410               415

ttc ggg ttc ggc att gac ggc gtg gac tac gac cag ccc gtg gac gtg       1296
Phe Gly Phe Gly Ile Asp Gly Val Asp Tyr Asp Gln Pro Val Asp Val
          420               425               430
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gag gcg gac ctc ccc agt gct gcc cag cag tag                          1329
Glu Ala Asp Leu Pro Ser Ala Ala Gln Gln
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<210> 5

<211> 442

<212> PRT

<213> Euglena gracilis

<400> 5

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Met Gly Arg Arg Gly Ala Ala Val Gly Gly Ala Ala Arg Gly Arg Gly
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Leu Leu Arg Thr Gly Ala Val Val Val Asn Ile Ala Thr Ala Val Thr
            20                  25                  30


His Leu Ala Pro Pro Met Ala Met Phe Thr Thr Thr Ala Lys Val Ile
        35                  40                  45


Gln Pro Lys Ile Arg Gly Phe Ile Cys Thr Thr Thr His Pro Ile Gly
    50                  55                  60


Cys Glu Lys Arg Val Gln Glu Glu Ile Ala Tyr Ala Arg Ala His Pro
65                  70                  75                  80


Pro Thr Ser Pro Gly Pro Lys Arg Val Leu Val Ile Gly Cys Ser Thr
                85                  90                  95


Gly Tyr Gly Leu Ser Thr Arg Ile Thr Ala Ala Phe Gly Tyr Gln Ala
                100                 105                 110


Ala Thr Leu Gly Val Phe Leu Ala Gly Pro Pro Thr Lys Gly Arg Pro
            115                 120                 125


Ala Ala Ala Gly Trp Tyr Asn Thr Val Ala Phe Glu Lys Ala Ala Leu
        130                 135                 140


Glu Ala Gly Leu Tyr Ala Arg Ser Leu Asn Gly Asp Ala Phe Asp Ser
145                 150                 155                 160
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Thr Thr Lys Ala Arg Thr Val Glu Ala Ile Lys Arg Asp Leu Gly Thr
            165   170   175

Val Asp Leu Val Val Tyr Ser Ile Ala Ala Pro Lys Arg Thr Asp Pro
            180   185   190

Ala Thr Gly Val Leu His Lys Ala Cys Leu Lys Pro Ile Gly Ala Thr
            195   200   205

Tyr Thr Asn Arg Thr Val Asn Thr Asp Lys Ala Glu Val Thr Asp Val
    210   215   220

Ser Ile Glu Pro Ala Ser Pro Glu Glu Ile Ala Asp Thr Val Lys Val
225   230   235   240

Met Gly Gly Glu Asp Trp Glu Leu Trp Ile Gln Ala Leu Ser Glu Ala
            245   250   -   255

Gly Val Leu Ala Glu Gly Ala Lys Thr Val Ala Tyr Ser Tyr Ile Gly
            260   265   270

Pro Glu Met Thr Trp Pro Val Tyr Trp Ser Gly Thr Ile Gly Glu Ala
            275   280   285

Lys Lys Asp Val Glu Lys Ala Ala Lys Arg Ile Thr Gln Gln Tyr Gly
    290   295   300

Cys Pro Ala Tyr Pro Val Val Ala Lys Ala Leu Val Thr Gln Ala Ser
305   310   315   320

Ser Ala Ile Pro Val Val Pro Leu Tyr Ile Cys Leu Leu Tyr Arg Val
            325   330   335

Met Lys Glu Lys Gly Thr His Glu Gly Cys Ile Glu Gln Met Val Arg
            340   345   350

Leu Leu Thr Thr Lys Leu Tyr Pro Glu Asn Gly Ala Pro Ile Val Asp
            355   360   365

Glu Ala Gly Arg Val Arg Val Asp Asp Trp Glu Met Ala Glu Asp Val
    370   375   380

```
Gln Gln Ala Val Lys Asp Leu Trp Ser Gln Val Ser Thr Ala Asn Leu
385             390             395             400

Lys Asp Ile Ser Asp Phe Ala Gly Tyr Gln Thr Glu Phe Leu Arg Leu
                405             410             415

Phe Gly Phe Gly Ile Asp Gly Val Asp Tyr Asp Gln Pro Val Asp Val
            420             425             430

Glu Ala Asp Leu Pro Ser Ala Ala Gln Gln
        435             440
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<210> 6

<211> 1212

<212> DNA

<213> Euglena gracilis

<220>

<221> CDS

<222> (1)..(1212)

<223>

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Met Phe Thr Thr Thr Ala Lys Val Ile Gln Pro Lys Ile Arg Gly Phe
1               5               10              15

atc tgc acg acc acc cac ccg atc ggc tgt gag aag cgg gtc cag gag        96
Ile Cys Thr Thr Thr His Pro Ile Gly Cys Glu Lys Arg Val Gln Glu
                20              25              30

gag atc gcg tac gcc cgt gcc cac ccg ccc acc agc cct ggc ccg aag       144
Glu Ile Ala Tyr Ala Arg Ala His Pro Pro Thr Ser Pro Gly Pro Lys
            35              40              45

agg gtg ctg gtc atc ggc tgc agt acc ggc tac ggg ctc tcc acc cgc       192
Arg Val Leu Val Ile Gly Cys Ser Thr Gly Tyr Gly Leu Ser Thr Arg
        50              55              60

atc acc gct gcc ttc ggc tac cag gcc gcc acg ctg ggc gtg ttc ctg       240
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Ile Thr Ala Ala Phe Gly Tyr Gln Ala Ala Thr Leu Gly Val Phe Leu
65              70              75                  80

gcg ggc ccc ccg acg aag ggc cgc ccc gcc gcg gcg ggc tgg tac aac      288
Ala Gly Pro Pro Thr Lys Gly Arg Pro Ala Ala Ala Gly Trp Tyr Asn
                85              90              95

acc gtg gcg ttc gag aag gcc gcc ctg gag gcc ggg ctg tac gcc cgg      336
Thr Val Ala Phe Glu Lys Ala Ala Leu Glu Ala Gly Leu Tyr Ala Arg
            100             105             110

agc ctt aat ggc gac gcc ttc gac tcc aca acg aag gcg cgg acg gtc      384
Ser Leu Asn Gly Asp Ala Phe Asp Ser Thr Thr Lys Ala Arg Thr Val
            115             120             125

gag gcg atc aag cgg gac ctc ggc acg gtg gac ctc gtg gtg tac agc      432
Glu Ala Ile Lys Arg Asp Leu Gly Thr Val Asp Leu Val Val Tyr Ser
        130             135             140

atc gcc gcc ccg aag cgg acg gac cct gcc acc ggc gtc ctc cac aag      480
Ile Ala Ala Pro Lys Arg Thr Asp Pro Ala Thr Gly Val Leu His Lys
145             150             155             160

gcc tgc ctg aag ccc atc ggc gcc acg tac acc aac cgc act gtg aac      528
Ala Cys Leu Lys Pro Ile Gly Ala Thr Tyr Thr Asn Arg Thr Val Asn
                165             170             175

acc gac aag gcg gag gtg acc gac gtc agc att gag ccg gcc tcc ccc      576
Thr Asp Lys Ala Glu Val Thr Asp Val Ser Ile Glu Pro Ala Ser Pro
            180             185             190

gaa gag atc gcg gac acg gtg aag gtg atg ggc ggg gag gac tgg gag      624
Glu Glu Ile Ala Asp Thr Val Lys Val Met Gly Gly Glu Asp Trp Glu
            195             200             205

ctc tgg atc cag gcg ctg tcg gag gcc ggc gtg ctg gcg gag ggg gcc      672
Leu Trp Ile Gln Ala Leu Ser Glu Ala Gly Val Leu Ala Glu Gly Ala
        210             215             220

aag acg gtg gcg tac tcc tac atc ggc ccc gag atg acg tgg cct gtc      720
Lys Thr Val Ala Tyr Ser Tyr Ile Gly Pro Glu Met Thr Trp Pro Val
225             230             235             240

tac tgg tcc ggc acc atc ggg gag gcc aag aag gac gtg gag aag gct      768
Tyr Trp Ser Gly Thr Ile Gly Glu Ala Lys Lys Asp Val Glu Lys Ala
            245             250             255

gcc aag cgc atc acg cag cag tac ggc tgc ccg gcg tac ccg gtg gtg      816
Ala Lys Arg Ile Thr Gln Gln Tyr Gly Cys Pro Ala Tyr Pro Val Val
            260             265             270

gcc aag gcc ttg gtc acc cag gcc agc tcc gcc atc ccg gtg gtg ccg      864
Ala Lys Ala Leu Val Thr Gln Ala Ser Ser Ala Ile Pro Val Val Pro
            275             280             285

ctc tac atc tgc ctg ctg tac cgc gtt atg aag gag aag ggc acc cac      912
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14

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    Leu Tyr Ile Cys Leu Leu Tyr Arg Val Met Lys Glu Lys Gly Thr His
        290                 295                 300

    gag ggc tgc atc gag cag atg gtg cgg ctg ctc acc acg aag ctg tac      960
    Glu Gly Cys Ile Glu Gln Met Val Arg Leu Leu Thr Thr Lys Leu Tyr
    305                 310                 315                 320

    ccc gag aac ggg gcc ccc atc gtc gat gag gcc gga cgt gtg cgg gtg     1008
    Pro Glu Asn Gly Ala Pro Ile Val Asp Glu Ala Gly Arg Val Arg Val
                        325                 330                 335

    gat gac tgg gag atg gcg gag gat gtg cag cag gct gtt aag gac ctc     1056
    Asp Asp Trp Glu Met Ala Glu Asp Val Gln Gln Ala Val Lys Asp Leu
                    340                 345                 350

    tgg agc cag gtg agc act gcc aac ctc aag gac atc tcc gac ttc gct     1104
    Trp Ser Gln Val Ser Thr Ala Asn Leu Lys Asp Ile Ser Asp Phe Ala
                355                 360                 365

    ggg tat caa act gag ttc ctg cgg ctg ttc ggg ttc ggc att gac ggc     1152
    Gly Tyr Gln Thr Glu Phe Leu Arg Leu Phe Gly Phe Gly Ile Asp Gly
        370                 375                 380

    gtg gac tac gac cag ccc gtg gac gtg gag gcg gac ctc ccc agt gct     1200
    Val Asp Tyr Asp Gln Pro Val Asp Val Glu Ala Asp Leu Pro Ser Ala
    385                 390                 395                 400

    gcc cag cag tag                                                     1212
    Ala Gln Gln
```

<210> 7

<211> 403

<212> PRT

<213> Euglena gracilis

<400> 7

```
    Met Phe Thr Thr Thr Ala Lys Val Ile Gln Pro Lys Ile Arg Gly Phe
    1                 5                   10                  15

    Ile Cys Thr Thr Thr His Pro Ile Gly Cys Glu Lys Arg Val Gln Glu
                    20                  25                  30

    Glu Ile Ala Tyr Ala Arg Ala His Pro Pro Thr Ser Pro Gly Pro Lys
                35                  40                  45
```

```
Arg Val Leu Val Ile Gly Cys Ser Thr Gly Tyr Gly Leu Ser Thr Arg
    50              55                  60


Ile Thr Ala Ala Phe Gly Tyr Gln Ala Ala Thr Leu Gly Val Phe Leu
65              70                  75                  80


Ala Gly Pro Pro Thr Lys Gly Arg Pro Ala Ala Ala Gly Trp Tyr Asn
            85                  90                  95


Thr Val Ala Phe Glu Lys Ala Ala Leu Glu Ala Gly Leu Tyr Ala Arg
            100                 105                 110


Ser Leu Asn Gly Asp Ala Phe Asp Ser Thr Thr Lys Ala Arg Thr Val
        115                 120                 125


Glu Ala Ile Lys Arg Asp Leu Gly Thr Val Asp Leu Val Val Tyr Ser
    130                 135                 140


Ile Ala Ala Pro Lys Arg Thr Asp Pro Ala Thr Gly Val Leu His Lys
145             150                 155                 160


Ala Cys Leu Lys Pro Ile Gly Ala Thr Tyr Thr Asn Arg Thr Val Asn
            165                 170                 175


Thr Asp Lys Ala Glu Val Thr Asp Val Ser Ile Glu Pro Ala Ser Pro
            180                 185                 190


Glu Glu Ile Ala Asp Thr Val Lys Val Met Gly Gly Glu Asp Trp Glu
        195                 200                 205


Leu Trp Ile Gln Ala Leu Ser Glu Ala Gly Val Leu Ala Glu Gly Ala
    210                 215                 220


Lys Thr Val Ala Tyr Ser Tyr Ile Gly Pro Glu Met Thr Trp Pro Val
225             230                 235                 240


Tyr Trp Ser Gly Thr Ile Gly Glu Ala Lys Lys Asp Val Glu Lys Ala
            245                 250                 255


Ala Lys Arg Ile Thr Gln Gln Tyr Gly Cys Pro Ala Tyr Pro Val Val
            260                 265                 270
```

```
Ala Lys Ala Leu Val Thr Gln Ala Ser Ser Ala Ile Pro Val Val Pro
        275                 280                 285


Leu Tyr Ile Cys Leu Leu Tyr Arg Val Met Lys Glu Lys Gly Thr His
        290                 295                 300


Glu Gly Cys Ile Glu Gln Met Val Arg Leu Leu Thr Thr Lys Leu Tyr
305                 310                 315                 320


Pro Glu Asn Gly Ala Pro Ile Val Asp Glu Ala Gly Arg Val Arg Val
                325                 330                 335


Asp Asp Trp Glu Met Ala Glu Asp Val Gln Gln Ala Val Lys Asp Leu
                340                 345                 350


Trp Ser Gln Val Ser Thr Ala Asn Leu Lys Asp Ile Ser Asp Phe Ala
        355                 360                 365


Gly Tyr Gln Thr Glu Phe Leu Arg Leu Phe Gly Phe Gly Ile Asp Gly
        370                 375                 380


Val Asp Tyr Asp Gln Pro Val Asp Val Glu Ala Asp Leu Pro Ser Ala
385                 390                 395                 400


Ala Gln Gln
```

<210> 8

<211> 1803

<212> DNA

<213> Euglena gracilis

<220>

<221> CDS

<222> (1)..(1803)

<223>

<400>   8

```
atg gct tct atg ata tcc tct tca gct gtg act aca gtc agc cgt gct        48
Met Ala Ser Met Ile Ser Ser Ser Ala Val Thr Thr Val Ser Arg Ala
1               5                   10                  15

tct acg gtg caa tcg gcc gcg gtg gct cca ttc ggc ggc ctc aaa tcc        96
Ser Thr Val Gln Ser Ala Ala Val Ala Pro Phe Gly Gly Leu Lys Ser
            20                  25                  30

atg act gga ttc cca gtt aag aag gtc aac act gac att act tcc att       144
Met Thr Gly Phe Pro Val Lys Lys Val Asn Thr Asp Ile Thr Ser Ile
            35                  40                  45

aca agc aat ggt gga aga gta aag tat tta aat ctc gag atg tcg tgc       192
Thr Ser Asn Gly Gly Arg Val Lys Tyr Leu Asn Leu Glu Met Ser Cys
        50                  55                  60

ccc gcc tcg ccg tct gct gcc gtg gtg tct gcc ggc gcc ctc tgc ctg       240
Pro Ala Ser Pro Ser Ala Ala Val Val Ser Ala Gly Ala Leu Cys Leu
65                  70                  75                  80

tgc gtg gca acg gta ttg ttg gcg act gga tcc aac ccc acc gcc ctg       288
Cys Val Ala Thr Val Leu Leu Ala Thr Gly Ser Asn Pro Thr Ala Leu
                85                  90                  95

tcc act gct tcc act cgc tct ccg acc tca ctg gtc cgt ggg gtg gac       336
Ser Thr Ala Ser Thr Arg Ser Pro Thr Ser Leu Val Arg Gly Val Asp
            100                 105                 110

agg ggc ttg atg agg cca acc act gca gcg gct ctg acg aca atg aga       384
Arg Gly Leu Met Arg Pro Thr Thr Ala Ala Ala Leu Thr Thr Met Arg
            115                 120                 125

gag gtg ccc cag atg gct gag gga ttt tca ggc gaa gcc acg tct gca       432
Glu Val Pro Gln Met Ala Glu Gly Phe Ser Gly Glu Ala Thr Ser Ala
        130                 135                 140

tgg gcc gcc gcg ggg ccg cag tgg gcg gcg ccg ctc gtg gcc gcg gcc       480
Trp Ala Ala Ala Gly Pro Gln Trp Ala Ala Pro Leu Val Ala Ala Ala
145                 150                 155                 160

tcc tcc gca ctg gcg ctg tgg tgg tgg gcc gcc cgg cgc agc gtg cgg       528
Ser Ser Ala Leu Ala Leu Trp Trp Trp Ala Ala Arg Arg Ser Val Arg
                165                 170                 175

cgg ccg ctg gca gcg ctg gcg gag ctg ccc acc gcg gtc acc cac ctg       576
Arg Pro Leu Ala Ala Leu Ala Glu Leu Pro Thr Ala Val Thr His Leu
            180                 185                 190

gcc ccc ccg atg gcg atg ttc acc acc aca gcg aag gtc atc cag ccc       624
Ala Pro Pro Met Ala Met Phe Thr Thr Thr Ala Lys Val Ile Gln Pro
            195                 200                 205

aag att cgt ggc ttc atc tgc acg acc acc cac ccg atc ggc tgt gag       672
Lys Ile Arg Gly Phe Ile Cys Thr Thr Thr His Pro Ile Gly Cys Glu
        210                 215                 220
```

```
aag cgg gtc cag gag gag atc gcg tac gcc cgt gcc cac ccg ccc acc    720
Lys Arg Val Gln Glu Glu Ile Ala Tyr Ala Arg Ala His Pro Pro Thr
225             230             235             240

agc cct ggc ccg aag agg gtg ctg gtc atc ggc tgc agt acc ggc tac    768
Ser Pro Gly Pro Lys Arg Val Leu Val Ile Gly Cys Ser Thr Gly Tyr
                245             250             255

ggg ctc tcc acc cgc atc acc gct gcc ttc ggc tac cag gcc gcc acg    816
Gly Leu Ser Thr Arg Ile Thr Ala Ala Phe Gly Tyr Gln Ala Ala Thr
            260             265             270

ctg ggc gtg ttc ctg gcg ggc ccc ccg acg aag ggc cgc ccc gcc gcg    864
Leu Gly Val Phe Leu Ala Gly Pro Pro Thr Lys Gly Arg Pro Ala Ala
            275             280             285

gcg ggc tgg tac aac acc gtg gcg ttc gag aag gcc gcc ctg gag gcc    912
Ala Gly Trp Tyr Asn Thr Val Ala Phe Glu Lys Ala Ala Leu Glu Ala
    290             295             300

ggg ctg tac gcc cgg agc ctt aat ggc gac gcc ttc gac tcc aca acg    960
Gly Leu Tyr Ala Arg Ser Leu Asn Gly Asp Ala Phe Asp Ser Thr Thr
305             310             315             320

aag gcg cgg acg gtc gag gcg atc aag cgg gac ctc ggc acg gtg gac    1008
Lys Ala Arg Thr Val Glu Ala Ile Lys Arg Asp Leu Gly Thr Val Asp
                325             330             335

ctc gtg gtg tac agc atc gcc gcc ccg aag cgg acg gac cct gcc acc    1056
Leu Val Val Tyr Ser Ile Ala Ala Pro Lys Arg Thr Asp Pro Ala Thr
            340             345             350

ggc gtc ctc cac aag gcc tgc ctg aag ccc atc ggc gcc acg tac acc    1104
Gly Val Leu His Lys Ala Cys Leu Lys Pro Ile Gly Ala Thr Tyr Thr
            355             360             365

aac cgc act gtg aac acc gac aag gcg gag gtg acc gac gtc agc att    1152
Asn Arg Thr Val Asn Thr Asp Lys Ala Glu Val Thr Asp Val Ser Ile
    370             375             380

gag ccg gcc tcc ccc gaa gag atc gcg gac acg gtg aag gtg atg ggc    1200
Glu Pro Ala Ser Pro Glu Glu Ile Ala Asp Thr Val Lys Val Met Gly
385             390             395             400

ggg gag gac tgg gag ctc tgg atc cag gcg ctg tcg gag gcc ggc gtg    1248
Gly Glu Asp Trp Glu Leu Trp Ile Gln Ala Leu Ser Glu Ala Gly Val
                405             410             415

ctg gcg gag ggg gcc aag acg gtg gcg tac tcc tac atc ggc ccc gag    1296
Leu Ala Glu Gly Ala Lys Thr Val Ala Tyr Ser Tyr Ile Gly Pro Glu
                420             425             430

atg acg tgg cct gtc tac tgg tcc ggc acc atc ggg gag gcc aag aag    1344
Met Thr Trp Pro Val Tyr Trp Ser Gly Thr Ile Gly Glu Ala Lys Lys
                435             440             445
```

```
gac gtg gag aag gct gcc aag cgc atc acg cag cag tac ggc tgc ccg      1392
Asp Val Glu Lys Ala Ala Lys Arg Ile Thr Gln Gln Tyr Gly Cys Pro
        450                 455                 460

gcg tac ccg gtg gtg gcc aag gcc ttg gtc acc cag gcc agc tcc gcc      1440
Ala Tyr Pro Val Val Ala Lys Ala Leu Val Thr Gln Ala Ser Ser Ala
465                 470                 475                 480

atc ccg gtg gtg ccg ctc tac atc tgc ctg ctg tac cgc gtt atg aag      1488
Ile Pro Val Val Pro Leu Tyr Ile Cys Leu Leu Tyr Arg Val Met Lys
                485                 490                 495

gag aag ggc acc cac gag ggc tgc atc gag cag atg gtg cgg ctg ctc      1536
Glu Lys Gly Thr His Glu Gly Cys Ile Glu Gln Met Val Arg Leu Leu
            500                 505                 510

acc acg aag ctg tac ccc gag aac ggg gcc ccc atc gtc gat gag gcc      1584
Thr Thr Lys Leu Tyr Pro Glu Asn Gly Ala Pro Ile Val Asp Glu Ala
            515                 520                 525

gga cgt gtg cgg gtg gat gac tgg gag atg gcg gag gat gtg cag cag      1632
Gly Arg Val Arg Val Asp Asp Trp Glu Met Ala Glu Asp Val Gln Gln
        530                 535                 540

gct gtt aag gac ctc tgg agc cag gtg agc act gcc aac ctc aag gac      1680
Ala Val Lys Asp Leu Trp Ser Gln Val Ser Thr Ala Asn Leu Lys Asp
545                 550                 555                 560

atc tcc gac ttc gct ggg tat caa act gag ttc ctg cgg ctg ttc ggg      1728
Ile Ser Asp Phe Ala Gly Tyr Gln Thr Glu Phe Leu Arg Leu Phe Gly
                565                 570                 575

ttc ggc att gac ggc gtg gac tac gac cag ccc gtg gac gtg gag gcg      1776
Phe Gly Ile Asp Gly Val Asp Tyr Asp Gln Pro Val Asp Val Glu Ala
                580                 585                 590

gac ctc ccc agt gct gcc cag cag tag                                  1803
Asp Leu Pro Ser Ala Ala Gln Gln
            595                 600
```

<210> 9

<211> 600

<212> PRT

<213> Euglena gracilis

<400> 9

```
Met Ala Ser Met Ile Ser Ser Ser Ala Val Thr Thr Val Ser Arg Ala
1               5                   10                  15
```

Ser Thr Val Gln Ser Ala Ala Val Ala Pro Phe Gly Gly Leu Lys Ser
          20   25   30

Met Thr Gly Phe Pro Val Lys Lys Val Asn Thr Asp Ile Thr Ser Ile
          35   40   45

Thr Ser Asn Gly Gly Arg Val Lys Tyr Leu Asn Leu Glu Met Ser Cys
     50   55   60

Pro Ala Ser Pro Ser Ala Ala Val Val Ser Ala Gly Ala Leu Cys Leu
65   70   75   80

Cys Val Ala Thr Val Leu Leu Ala Thr Gly Ser Asn Pro Thr Ala Leu
              85   90   95

Ser Thr Ala Ser Thr Arg Ser Pro Thr Ser Leu Val Arg Gly Val Asp
              100   105   110

Arg Gly Leu Met Arg Pro Thr Thr Ala Ala Ala Leu Thr Thr Met Arg
          115   120   125

Glu Val Pro Gln Met Ala Glu Gly Phe Ser Gly Glu Ala Thr Ser Ala
     130   135   140

Trp Ala Ala Ala Gly Pro Gln Trp Ala Ala Pro Leu Val Ala Ala Ala
145   150   155   160

Ser Ser Ala Leu Ala Leu Trp Trp Trp Ala Ala Arg Arg Ser Val Arg
              165   170   175

Arg Pro Leu Ala Ala Leu Ala Glu Leu Pro Thr Ala Val Thr His Leu
          180   185   190

Ala Pro Pro Met Ala Met Phe Thr Thr Thr Ala Lys Val Ile Gln Pro
          195   200   205

Lys Ile Arg Gly Phe Ile Cys Thr Thr Thr His Pro Ile Gly Cys Glu
     210   215   220

Lys Arg Val Gln Glu Glu Ile Ala Tyr Ala Arg Ala His Pro Pro Thr
225   230   235   240

Ser Pro Gly Pro Lys Arg Val Leu Val Ile Gly Cys Ser Thr Gly Tyr
            245   250   255

Gly Leu Ser Thr Arg Ile Thr Ala Ala Phe Gly Tyr Gln Ala Ala Thr
            260   265   270

Leu Gly Val Phe Leu Ala Gly Pro Pro Thr Lys Gly Arg Pro Ala Ala
        275   280   285

Ala Gly Trp Tyr Asn Thr Val Ala Phe Glu Lys Ala Ala Leu Glu Ala
    290   295   300

Gly Leu Tyr Ala Arg Ser Leu Asn Gly Asp Ala Phe Asp Ser Thr Thr
305   310   315   320

Lys Ala Arg Thr Val Glu Ala Ile Lys Arg Asp Leu Gly Thr Val Asp
            325   330   335

Leu Val Val Tyr Ser Ile Ala Ala Pro Lys Arg Thr Asp Pro Ala Thr
            340   345   350

Gly Val Leu His Lys Ala Cys Leu Lys Pro Ile Gly Ala Thr Tyr Thr
            355   360   365

Asn Arg Thr Val Asn Thr Asp Lys Ala Glu Val Thr Asp Val Ser Ile
    370   375   380

Glu Pro Ala Ser Pro Glu Glu Ile Ala Asp Thr Val Lys Val Met Gly
385   390   395   400

Gly Glu Asp Trp Glu Leu Trp Ile Gln Ala Leu Ser Glu Ala Gly Val
            405   410   415

Leu Ala Glu Gly Ala Lys Thr Val Ala Tyr Ser Tyr Ile Gly Pro Glu
            420   425   430

Met Thr Trp Pro Val Tyr Trp Ser Gly Thr Ile Gly Glu Ala Lys Lys
        435   440   445

Asp Val Glu Lys Ala Ala Lys Arg Ile Thr Gln Gln Tyr Gly Cys Pro
    450   455   460

Ala Tyr Pro Val Val Ala Lys Ala Leu Val Thr Gln Ala Ser Ser Ala
465   470   475   480

Ile Pro Val Val Pro Leu Tyr Ile Cys Leu Leu Tyr Arg Val Met Lys
                485   490   495

Glu Lys Gly Thr His Glu Gly Cys Ile Glu Gln Met Val Arg Leu Leu
            500   505   510

Thr Thr Lys Leu Tyr Pro Glu Asn Gly Ala Pro Ile Val Asp Glu Ala
            515   520   525

Gly Arg Val Arg Val Asp Asp Trp Glu Met Ala Glu Asp Val Gln Gln
    530   535   540

Ala Val Lys Asp Leu Trp Ser Gln Val Ser Thr Ala Asn Leu Lys Asp
545   550   555   560

Ile Ser Asp Phe Ala Gly Tyr Gln Thr Glu Phe Leu Arg Leu Phe Gly
            565   570   575

Phe Gly Ile Asp Gly Val Asp Tyr Asp Gln Pro Val Asp Val Glu Ala
            580   585   590

Asp Leu Pro Ser Ala Ala Gln Gln
        595   600

<210> 10

<211> 1389

<212> DNA

<213> Euglena gracilis

<220>

<221> CDS

<222> (1)..(1389)

<223>

<400> 10

```
atg gct tct atg ata tcc tct tca gct gtg act aca gtc agc cgt gct       48
Met Ala Ser Met Ile Ser Ser Ser Ala Val Thr Thr Val Ser Arg Ala
1               5               10              15

tct acg gtg caa tcg gcc gcg gtg gct cca ttc ggc ggc ctc aaa tcc       96
Ser Thr Val Gln Ser Ala Ala Val Ala Pro Phe Gly Gly Leu Lys Ser
            20              25              30

atg act gga ttc cca gtt aag aag gtc aac act gac att act tcc att      144
Met Thr Gly Phe Pro Val Lys Lys Val Asn Thr Asp Ile Thr Ser Ile
        35              40              45

aca agc aat ggt gga aga gta aag tat tta aat atg ttc acc acc aca      192
Thr Ser Asn Gly Gly Arg Val Lys Tyr Leu Asn Met Phe Thr Thr Thr
        50              55              60

gcg aag gtc atc cag ccc aag att cgt ggc ttc atc tgc acg acc acc      240
Ala Lys Val Ile Gln Pro Lys Ile Arg Gly Phe Ile Cys Thr Thr Thr
65              70              75              80

cac ccg atc ggc tgt gag aag cgg gtc cag gag gag atc gcg tac gcc      288
His Pro Ile Gly Cys Glu Lys Arg Val Gln Glu Glu Ile Ala Tyr Ala
                85              90              95

cgt gcc cac ccg ccc acc agc cct ggc ccg aag agg gtg ctg gtc atc      336
Arg Ala His Pro Pro Thr Ser Pro Gly Pro Lys Arg Val Leu Val Ile
            100             105             110

ggc tgc agt acc ggc tac ggg ctc tcc acc cgc atc acc gct gcc ttc      384
Gly Cys Ser Thr Gly Tyr Gly Leu Ser Thr Arg Ile Thr Ala Ala Phe
            115             120             125

ggc tac cag gcc gcc acg ctg ggc gtg ttc ctg gcg ggc ccc ccg acg      432
Gly Tyr Gln Ala Ala Thr Leu Gly Val Phe Leu Ala Gly Pro Pro Thr
        130             135             140

aag ggc cgc ccc gcc gcg gcg ggc tgg tac aac acc gtg gcg ttc gag      480
Lys Gly Arg Pro Ala Ala Ala Gly Trp Tyr Asn Thr Val Ala Phe Glu
145             150             155             160

aag gcc gcc ctg gag gcc ggg ctg tac gcc cgg agc ctt aat ggc gac      528
Lys Ala Ala Leu Glu Ala Gly Leu Tyr Ala Arg Ser Leu Asn Gly Asp
                165             170             175

gcc ttc gac tcc aca acg aag gcg cgg acg gtc gag gcg atc aag cgg      576
Ala Phe Asp Ser Thr Thr Lys Ala Arg Thr Val Glu Ala Ile Lys Arg
            180             185             190

gac ctc ggc acg gtg gac ctc gtg gtg tac agc atc gcc gcc ccg aag      624
Asp Leu Gly Thr Val Asp Leu Val Val Tyr Ser Ile Ala Ala Pro Lys
            195             200             205

cgg acg gac cct gcc acc ggc gtc ctc cac aag gcc tgc ctg aag ccc      672
```

```
    Arg Thr Asp Pro Ala Thr Gly Val Leu His Lys Ala Cys Leu Lys Pro
        210             215             220

atc ggc gcc acg tac acc aac cgc act gtg aac acc gac aag gcg gag        720
Ile Gly Ala Thr Tyr Thr Asn Arg Thr Val Asn Thr Asp Lys Ala Glu
225             230             235             240

gtg acc gac gtc agc att gag ccg gcc tcc ccc gaa gag atc gcg gac        768
Val Thr Asp Val Ser Ile Glu Pro Ala Ser Pro Glu Glu Ile Ala Asp
                245             250             255

acg gtg aag gtg atg ggc ggg gag gac tgg gag ctc tgg atc cag gcg        816
Thr Val Lys Val Met Gly Gly Glu Asp Trp Glu Leu Trp Ile Gln Ala
                260             265             270

ctg tcg gag gcc ggc gtg ctg gcg gag ggg gcc aag acg gtg gcg tac        864
Leu Ser Glu Ala Gly Val Leu Ala Glu Gly Ala Lys Thr Val Ala Tyr
                275             280             285

tcc tac atc ggc ccc gag atg acg tgg cct gtc tac tgg tcc ggc acc        912
Ser Tyr Ile Gly Pro Glu Met Thr Trp Pro Val Tyr Trp Ser Gly Thr
                290             295             300

atc ggg gag gcc aag aag gac gtg gag aag gct gcc aag cgc atc acg        960
Ile Gly Glu Ala Lys Lys Asp Val Glu Lys Ala Ala Lys Arg Ile Thr
305             310             315             320

cag cag tac ggc tgc ccg gcg tac ccg gtg gtg gcc aag gcc ttg gtc       1008
Gln Gln Tyr Gly Cys Pro Ala Tyr Pro Val Val Ala Lys Ala Leu Val
                325             330             335

acc cag gcc agc tcc gcc atc ccg gtg gtg ccg ctc tac atc tgc ctg       1056
Thr Gln Ala Ser Ser Ala Ile Pro Val Val Pro Leu Tyr Ile Cys Leu
                340             345             350

ctg tac cgc gtt atg aag gag aag ggc acc cac gag ggc tgc atc gag       1104
Leu Tyr Arg Val Met Lys Glu Lys Gly Thr His Glu Gly Cys Ile Glu
                355             360             365

cag atg gtg cgg ctg ctc acc acg aag ctg tac ccc gag aac ggg gcc       1152
Gln Met Val Arg Leu Leu Thr Thr Lys Leu Tyr Pro Glu Asn Gly Ala
        370             375             380

ccc atc gtc gat gag gcc gga cgt gtg cgg gtg gat gac tgg gag atg       1200
Pro Ile Val Asp Glu Ala Gly Arg Val Arg Val Asp Asp Trp Glu Met
385             390             395             400

gcg gag gat gtg cag cag gct gtt aag gac ctc tgg agc cag gtg agc       1248
Ala Glu Asp Val Gln Gln Ala Val Lys Asp Leu Trp Ser Gln Val Ser
                405             410             415

act gcc aac ctc aag gac atc tcc gac ttc gct ggg tat caa act gag       1296
Thr Ala Asn Leu Lys Asp Ile Ser Asp Phe Ala Gly Tyr Gln Thr Glu
                420             425             430

ttc ctg cgg ctg ttc ggg ttc ggc att gac ggc gtg gac tac gac cag       1344
```

```
Phe Leu Arg Leu Phe Gly Phe Gly Ile Asp Gly Val Asp Tyr Asp Gln
        435              440              445
```

```
ccc gtg gac gtg gag gcg gac ctc ccc agt gct gcc cag cag tag        1389
Pro Val Asp Val Glu Ala Asp Leu Pro Ser Ala Ala Gln Gln
        450              455              460
```

<210> 11

<211> 462

<212> PRT

<213> Euglena gracilis

<400> 11

```
Met Ala Ser Met Ile Ser Ser Ser Ala Val Thr Thr Val Ser Arg Ala
1                   5              10                  15
```

```
Ser Thr Val Gln Ser Ala Ala Val Ala Pro Phe Gly Gly Leu Lys Ser
            20              25              30
```

```
Met Thr Gly Phe Pro Val Lys Lys Val Asn Thr Asp Ile Thr Ser Ile
            35              40              45
```

```
Thr Ser Asn Gly Gly Arg Val Lys Tyr Leu Asn Met Phe Thr Thr Thr
        50              55              60
```

```
Ala Lys Val Ile Gln Pro Lys Ile Arg Gly Phe Ile Cys Thr Thr Thr
65              70              75              80
```

```
His Pro Ile Gly Cys Glu Lys Arg Val Gln Glu Glu Ile Ala Tyr Ala
            85              90              95
```

```
Arg Ala His Pro Pro Thr Ser Pro Gly Pro Lys Arg Val Leu Val Ile
            100             105             110
```

```
Gly Cys Ser Thr Gly Tyr Gly Leu Ser Thr Arg Ile Thr Ala Ala Phe
            115             120             125
```

```
Gly Tyr Gln Ala Ala Thr Leu Gly Val Phe Leu Ala Gly Pro Pro Thr
            130             135             140
```

```
Lys Gly Arg Pro Ala Ala Ala Gly Trp Tyr Asn Thr Val Ala Phe Glu
145             150             155             160


Lys Ala Ala Leu Glu Ala Gly Leu Tyr Ala Arg Ser Leu Asn Gly Asp
                165             170             175


Ala Phe Asp Ser Thr Thr Lys Ala Arg Thr Val Glu Ala Ile Lys Arg
            180             185             190


Asp Leu Gly Thr Val Asp Leu Val Val Tyr Ser Ile Ala Ala Pro Lys
            195             200             205


Arg Thr Asp Pro Ala Thr Gly Val Leu His Lys Ala Cys Leu Lys Pro
    210             215             220


Ile Gly Ala Thr Tyr Thr Asn Arg Thr Val Asn Thr Asp Lys Ala Glu
225             230             235             240


Val Thr Asp Val Ser Ile Glu Pro Ala Ser Pro Glu Glu Ile Ala Asp
            245             250             255


Thr Val Lys Val Met Gly Gly Glu Asp Trp Glu Leu Trp Ile Gln Ala
            260             265             270


Leu Ser Glu Ala Gly Val Leu Ala Glu Gly Ala Lys Thr Val Ala Tyr
        275             280             285


Ser Tyr Ile Gly Pro Glu Met Thr Trp Pro Val Tyr Trp Ser Gly Thr
    290             295             300


Ile Gly Glu Ala Lys Lys Asp Val Glu Lys Ala Ala Lys Arg Ile Thr
305             310             315             320


Gln Gln Tyr Gly Cys Pro Ala Tyr Pro Val Val Ala Lys Ala Leu Val
            325             330             335


Thr Gln Ala Ser Ser Ala Ile Pro Val Val Pro Leu Tyr Ile Cys Leu
        340             345             350


Leu Tyr Arg Val Met Lys Glu Lys Gly Thr His Glu Gly Cys Ile Glu
    355             360             365
```

```
Gln Met Val Arg Leu Leu Thr Thr Lys Leu Tyr Pro Glu Asn Gly Ala
    370             375             380


Pro Ile Val Asp Glu Ala Gly Arg Val Arg Val Asp Asp Trp Glu Met
385             390             395             400


Ala Glu Asp Val Gln Gln Ala Val Lys Asp Leu Trp Ser Gln Val Ser
            405             410             415


Thr Ala Asn Leu Lys Asp Ile Ser Asp Phe Ala Gly Tyr Gln Thr Glu
            420             425             430


Phe Leu Arg Leu Phe Gly Phe Gly Ile Asp Gly Val Asp Tyr Asp Gln
            435             440             445


Pro Val Asp Val Glu Ala Asp Leu Pro Ser Ala Ala Gln Gln
    450             455             460
```